

UGAROVA, T.Yu.; TSEYTLIN, P.I.

Effect of desoxyribonucleic acid on the radiosensitivity of α -chymotrypsin
in an artificial desoxyribonucleic acid. α -chymotrypsin complex.
Biul. eksp. biol. i med. 50 no.7:55-58 J1 '60. (MIRA 14:5)

1. Iz Instituta eksperimental'noy biologii (dir. - prof. I.N.Mayskiy)
AMN SSSR, Moskva. Predstavlena deystvitel'nym chlenom AMN SSSR N.N.
Zhukovym-Verezhnikovym.

(RADIATION--PHYSIOLOGICAL EFFECT)
(CHYMOTRYPSIN) (NUCLEIC ACID)

DISKINA, R. S., and UGAROVA, T. Ya.

"A Study of Biological Activity of DNA Bound Proteins.
report submitted for the 5th Intl. Congress of Biochemistry, Moscow,
10-16 Aug 1961.

Inst. of Viral Preparations, Moscow.

UGAROVA, T. Yu., DYSKINA, L. S. (USSR).

Examination of the Biological activity of DNA-linked Proteins.

report presented at the 5th Int'l.
Biochemistry Congress, Moscow, 10-16 Aug. 1961

ACCESSION NR: AP4015083

S/0205/64/004/001/0047/0051

AUTHOR: Ugarova, T. Yu.; Diskina, B. S.; Tsaytlin, P. I.

TITLE: Radiosensitivity of ribonuclease in an artificial DNA-ribonuclease complex

SOURCE: Radiobiologiya, v. 4, no. 1, 1964, 47-51

TOPIC TAGS: ribonuclease radiosensitivity, artificial DNA-ribonuclease complex, X-irradiation, ribonuclease inactivation, free ribonuclease, ribonuclease radiation damage

ABSTRACT: Preparations of ribonuclease mixed with DNA, combined in a DNA complex, and in a free state were X-irradiated (RUT-60 unit, 50 kv, 15 ma, 2000 r/min) with doses ranging from 2 to 30 kr. Ribonuclease radiation damage was determined by decrease in enzyme activity. Artificial DNA-ribonuclease complexes were used in this study because of the heterogeneity of natural DNP protein composition and lack of reliable radiation damage indices. Findings show that X-irradiation inactivates ribonuclease combined in a DNA complex considerably more than in a free state or mixed with DNA. Possible mechanisms which may be responsible for the increased radiosensitivity of ribonuclease

Cord 1/2

ACCESSION NR: AP4015083

combined in a DNA complex, are discussed on the basis of the literature. Several studies of DNA-ribonuclease complexes indicate that approximately 25% of the total number of protein molecules combined with DNA undergo extensive deformation which is accompanied by almost complete loss of protein biological activity. With the ratio between DNA and protein in the artificial complex practically the same as in natural DNP, it appears possible that nucleic acids are inactivated by X-irradiation in a similar manner and this may lead to biological after effects on the chromosome level. Orig. art. has: 2 tables and 1 figure.

ASSOCIATION: Nauchno-issledovatel'skiy institut virusnykh preparatov, Moscow (Scientific-research Institute of Virus Preparations); Institut eksperimental'noy biologii AMN SSSR, Moscow (Institute of Experimental Biology, AMN SSSR)

SUBMITTED: 17Jul63

DATE ACQ: 12Mar64

ENCL: 00

SUB CODE: 18

NO REF SOV: 012

OTHER: 012

Card 2/2

ULANOVA, I.Ya. DUBELT, B.S.

Biological activity of human and bovine serum protein of the
pancreatic ribonuclease in the composition of artificially
obtained complexes of these proteins with DNA. Biochimie
28 no.5:914-923 Jil'g '64. (MTR 15 11)

1. Nauchno-issledovatel'skiy institut virusnykh preparatov,
Moskva.

COUNTRY :
 CATEGORY :
 ARG. JOUR. : RZhBiol., No.14, 1958, No. 63335
 AUTHOR : Ruehenbauer, T., Ugarynko A.
 INST. : -
 TITLE : Comparison of Spring Barley Varieties on the Basis of
 Experiments Carried Out in Poland During the Years 1950-
 1952.
 ORIG. PUB. : Roczn. nauk rolniczych, 1956, D 76, 237-354
 ABSTRACT : Selection of suitable regions for different varieties of
 spring barley. A description of 4 groups of varieties is
 given. Multi-row varieties of barley (Mazovetskiy and
 Granum 6-row) and hull-less (Bayskiy) are examined.

Card: 1/1

35

ACC NR: AP7002735

$$\frac{\partial c}{\partial t} = \frac{\partial}{\partial x} \left(D_{i.d.} \frac{\partial c}{\partial x} \right), \quad (1)$$

where c is the concentration of a given $D_{i.d.}$ element at point x at time instant t . Thus the problem of determining the function $D_{i.d.}(c)$ reduces to determining the concentration dependence of elements in the diffusion zone and the accuracy of calculation of $D_{i.d.}$ depends on the accuracy of plotting the curve of $c = c(x)$. It is shown that the method of local x-ray spectral analysis of chemical composition can be used to investigate interdiffusion in the systems Fe-Pd, Co-Pd, Ni-Pd, Cu-Pd over a broad range of temperatures provided that the investigator works only with the radiation of the element for which fluorescent excitation is absent in given binary system. Thus, the distribution of the concentration of investigated elements (such as Fe, Co, Ni) in the diffusion zone of vacuum-welded diffusion pairs can be analyzed according to the radiation of the lines $Fe K_{\alpha}$, $Co K_{\alpha}$, and $Ni K_{\alpha}$, respectively, with the characteristic x-ray spectrum being excited only by electron impact, in a RSASh-2 local x-ray spectrum analyzer. The resulting averaged and corrected curves of concentration are used to calculate the values of $D_{i.d.}(c)$ over the entire range of concentrations. No unambiguous correlation could be,

Card 2/3

ACC NR: AP7002735

established between these values and the fusibility diagrams of each system. The elucidation of the concentration dependence of the "effective" mobility of atoms on the basis of various physical characteristics of the alloys in binary alloys will be the subject of subsequent investigations. Orig. art. has: 2 tables, 4 figures, 3 formulas.

SUB CODE: 11, 20/ SUBM DATE: 04Apr66/ ORIG REF: 005/ OTH REF: 019

Card 3/3

AKULOV, V.D.; UGAY, L.P.

Diagnosis of congenital cysts of the lung in early childhood. Sov.
zdrav. Kir. no.2:62-63 Mr-Apr '62. (MIRA 15:5)

1. Iz detskogo otdeleniya (ispolnyayushchiy obyazannosti zaveduyushchego -
B.L.Kibrik) i patomorfologicheskoy laboratorii (zav. - kand.med.nauk
S.Kh.Khamitov) Kirgizskogo nauchno-issledovatel'skogo instituta
tuberkuleza.

(LUNGS--TUMORS)

(CYSTS)

PAK, Aleksey Andreyevich; ISAYENKO, N.P.; UGAY, M.A.

[Diversified state farms on virgin lands; based on the example of the "Kustanaiskii" State Farm, Kustanay Province] Mnogootraslevoi sovkhov na tselinnykh zemliakh; na primere sovkhova "Kustanaiskii," Kustanaiskoi oblasti. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 115 p. (MIRA 12:12)

(Kustanay Province--State farms)

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8

APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8"

phosphorus

SOURCE: IN SEER, Irregular Yearly Checkive material, v. 1,
no. 5, 1965, 663-667

ABSTRACT: An indirect chemical method has been developed for the determination of indium phosphide because all direct metallurgical methods are based on the use of indium phosphide.

phosphorus with a constant

and 100

Under the conditions described, produced mainly a white, amorphous powder. In addition to this main product, an intermediate, unstable phase of undetermined composition was observed. Chemical and x-ray analysis of the main product confirmed that it was indium phosphide. Chemical and electrical properties of the precipitated indium phosphide were determined. Temperature dependence of electrical conductivity was also determined.

State University)

Card 2/8

1. 2-2-65

ACCESSION NR: APS016580

SUBMITTED: 19Jan65

ENCL: 00

SUB CODE: 70. 90

NO REF SOV: 004

OTHER: 010

ATD PRESS: 4031

AUTHOR: DEBY, L. A.
Litvinskaya, L. A.

Card 1/3

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8

APPROVED FOR RELEASE: 04/03/2001

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"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8

KC

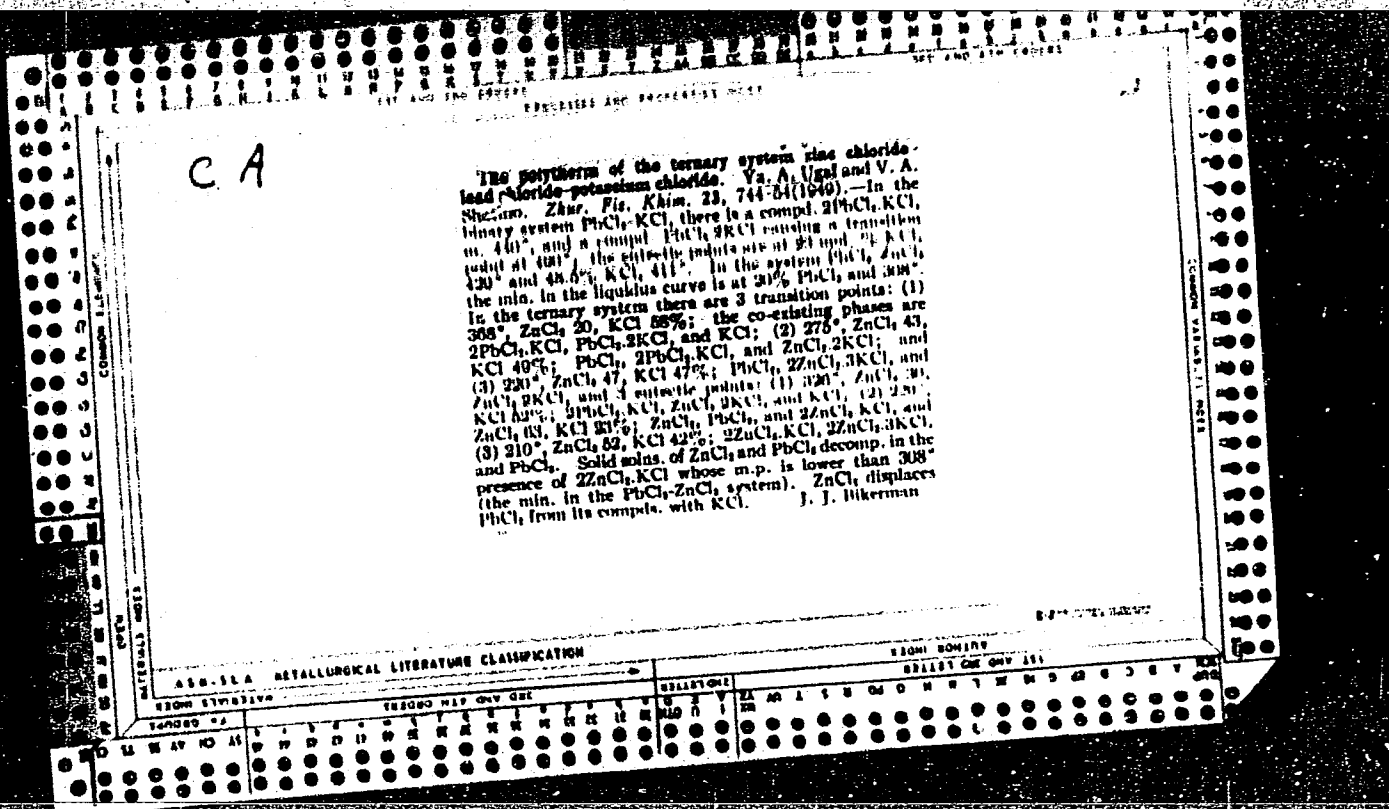
APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8"

UGAY, Ya.A.; ZAVAI'SKIY, Yu.P.; UGAY, V.A.; BOLKHOVITINA, N.B.

Production of indium phosphide by precipitation from a solution and
some of its properties. Izv. AN SSSR. Neorg. mat. 1 no.5:663-667 My
'65. (MIRA 18:10)

1. Voronezhskiy gosudarstvennyy universitet.



UGAI, YA. and

Ugai, Ya.; Simkina, T.

"Mutual Solubility in the System H_3BO_3 - KNO_3 - H_2O ." (p. 1768)

SO: Journal of General Chemistry, (Zhurnal Obshchei Khimii), 1950, Vol. 20, No. 10.

CA

Mutual solubility in the system boric acid-potassium nitrate-water. V. A. Ugal and T. Simkina (Voronezh State Univ.). *J. Gen. Chem. U.S.S.R.* 20, 1829-33(1950)(Engl. translation); 20, 1768-73(1950)(Russian Ed).—Equilibria in the system H_3BO_3 - KNO_3 - H_2O were investigated by the polythermal visual method, from the ternary eutectic (-3.2°) to 25° . The eutectic compn. is 2.90% H_3BO_3 , 10.75% KNO_3 , and 86.35% H_2O . No compds. are formed from the 3 components. KNO_3 has a "salting in" effect on H_3BO_3 , which is related to the decrease of the activity coeff. of H_3BO_3 . The activity coeffs. were computed for 0, 10, and 20° . W. A. Pennington

CA

2

Solubility polytherm of the ternary system KH_2PO_4 - H_3BO_3 - H_2O . Ya. A. Ugal. Zhur. Priklad. Khim. 29, 482-6 (1980).—The ternary system KH_2PO_4 - H_3BO_3 - H_2O from the f.p. to 40° was investigated by the visual polythermal method. Below 40° the compn. diagram contains the crystn. fields of the original components only. These components form a triple eutectic at -3.3° with the following compn.: 11.7% KH_2PO_4 + 8.6% H_3BO_3 + 85.7% H_2O . With an increase in temp. H_3BO_3 goes into soln. to a greater degree than KH_2PO_4 . This can serve as an indication that the boric acid is sepd. from solns. in the presence of the KH_2PO_4 .
J. Rovins Leach

CA

Q

Stability diagram of the ternary system PbCl_2 , CaCl_2 , KCl .

KCl . Ya. A. Ugal (Voronezh State Univ.). *Doklady Akad. Nauk SSSR*, 79, 623-4 (1981). Thermal analyses were made along 12 cuts in the ternary chloride system of Pb , Ca , and K ; the complete liquidus diagram is shown. There are no ternary complexes; only the binaries $2\text{PbCl}_2 \cdot \text{KCl}$ (I), $\text{PbCl}_2 \cdot 2\text{KCl}$ (II), and $\text{CaCl}_2 \cdot \text{KCl}$ (III). There are one ternary transition point and three ternary eutectics; the temp., mole % Pb , Ca , and K chlorides, and phases in equil. are, resp.: 481° , 35, 0.5, 58.5 , II + III + KCl ; 422° , 87, 17.5, 15.5, PbCl_2 + CaCl_2 + III; 420° , 71, 12, 17, PbCl_2 + I + III; and 402° , 50, 3, 47, I + II + III.

Worden Waring

UGAY, Ya.A.; GORDIN, V.L.

Growing of indium phosphide single crystals. Izv. AN SSSR, Neorg.
mat. 1 no.7:1051-1053 J1 '65. (MIRA 18:9)

1. Voronezhskiy gosudarstvennyy universitet.

UGAY, Ya.A.; BITYUTSKAYA, L.A.

Thermal stability of indium phosphide. Izv. AN SSSR. Neorg. mat. 1
no.7:1054-1056 J1 '65. (MIRA 18:9)

1. Voronezhskiy gosudarstvennyy universitet.

UCAY, Ye.A.; GONCHAROV, Ye.G.; BOLEKHOVETINA, N.D.; SHVYGENA, V.D.

Preparation of solid solutions of Fe_2O_3 of constant composition along the length of the ingot. Izv. AN SSSR. Neorg. mat. 1 no.7: 1104-1108 J1 '65. (MIRA 18:9)

1. Voronezhskiy gosudarstvennyy universitet.

UGAY, Ya.A.; AVERDAKH, Ya.M.; KRUZLOVA, G.S.

Production of single crystals of semiconductor phases in the system
Zn - Sb. Izv. vys. uch. zav.; fiz. 8 no.3:129-133 '66. (MIRA 13:9)

1. Voronezhskiy gosudarstvennyy universitet.

UGAY, Ya. A.

USSR/ Chemistry Decomposition

Card : 1/1 Pub. 151 - 8/33

Authors : Ugay, Ya. A.

Title : Thermographic investigation of the decomposition of oxalates of divalent metals

Periodical : Zhur. ob. khim, 24/8, 1315 - 1321, August 1954

Abstract : The decomposition of Fe, Ni, Co, Mn, Cu, Zn, Cd, Hg, Sn, Pb, Mg, Ca, Sr, Ba-oxalates as well as oxalic acid, was investigated thermographically. The endo- and exothermal type of curves showing the temperature of the thermal decomposition of oxalates of bivalent metals, was established. Irreversible conversion of the unstable solid substance into a thermodynamically stable crystalline state, was observed in several instances. The nature of the oxalate decomposition and its effect on the form of the thermograms, are explained. Eight USSR references (1939 - 1953). Tables; graphs.

Institution : State University, Voronezh

Submitted : February 22, 1954

UGAY, Ya. M.

11
6
0

Solid-phase reactions between nickel and zinc. Yu. A.

Ugal and Yu. A. Badk. J. Gen. Chem. U.S.S.R. 29

1955-5 (1955) (Engl. translation) - See C. A. 50, 7040b

B. M. R.

2

RM

LIGAY, Ya. A.

658* Solid-Phase Reaction of the Interaction of Nickel With
Zinc. Tverdofoznnia reaktsiya vzaimodeystviya nikelia s
tsinkom. (Russian.) Ya. A. Ligay and Yu. A. B. G. M. Zhurav.
obshch. khim. v. 25, no. 9, Sept. 1955, p. 1643-1651.
Reaction studied by physical-chemical methods. Significance of
liquid phase in the mechanism of the solid phase reactions, role
of Ni/Zn and Ni₂Zn compounds. Graphs, phase diagrams. 17 ref.

①
Df
MST

Ugay, Ya. A.

USSR/Chemistry - Reaction processes

Card 1/1 Pub. 22 - 23/51

Authors : Ugay, Ya. A., and Baslyk, Yu. A.

Title : Chemical reaction of Ni with Zn

Periodical : Dok. AN SSSR 101/2, 281-283, Mar 11, 1955

Abstract : Experimental data are presented regarding the chemical reaction of components occurring during the heating of Ni and Zn powders. A change in volume particularly for compositions of greater Ni content was observed during the heating of the Ni-Zn mixture. It was established that the Ni-Zn reaction has an explosive autocatalytic nature caused by the appearance of melted Zn in the mixture. Three references: 2 USSR and 1 German (1935-1953). Graphs.

Institution : State University, Voronezh

Presented by: Academician G. G. Urazov, October 4, 1954

Ugay, Ya. I.

USSR/Physical Chemistry - Thermodynamics, Thermochemistry, Equilibria,
Physical-Chemical Analysis, Phase Transitions.

B-8

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 3816.

Author : Ya. I. Ugay, A.P. Palkin

Inst : Voronezh University.

Title : Shift Regularity of Metathesis and Replacement Reactions
in Absence of Solvents.

Orig Pub: Tr. Voronezhsk. un-ta, 1956, 40, 11-16.

Abstract: The authors show with 30 examples that it is possible to judge
upon the metathesis direction by the difference between the
total energies of crystal lattices of salts to the right and
to the left of the equality sign in the reaction equation $AX +$
 $BY = AY + BX$.

Card : 1/1

-52-

USSR/Physical Chemistry, Thermodynamics, Thermochemistry, B-8
Equilibria, Physical-Chemical Analysis, Phase Transitions.

Abs Jour: Ref Zhur-Khimiya, No 5, 1957, 14614

Abstract: talline salt, the gaseous cation and the gaseous anion taken from thermochemical tables. Calculations for Li, Mg, Ca, Sr, Ba, Al, Mn, Fe, Co and Ni chloride hydrates are carried out. It is found that the lattice energy decreases with the increase of the number of water molecules in the crystal hydrate.

Card 2/2

SOV/137-58-8-17663

Investigation of the Quaternary Zn-Cd-Al System (cont.)

$\text{Zn}_4\text{Sb}_3\text{-AlSb}_3$ is obtained the eutectic point of which lies on the ordinate of the ZnSb compound. A true phase diagram of the ZnSb-AlSb system exhibits a region of limited solid solutions of AlSb in ZnSb .

L V

1. Aluminum-antimony-cadmium-zinc system analysis

Card 2/2

78-3-3-23/47

AUTHOR: Ugay, Ya. A.

TITLE: On the Phase Diagrams in the System Sb-Zn in the State of Nonequilibrium (O diagramme sostoyaniya sistemy Sb-Zn v neravnovesnykh usloviyakh)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 3, pp. 678-682 (USSR)

ABSTRACT: The phase diagrams in the system Sb-Zn in the nonequilibrium state were examined. By the powder-metallurgical and the casting method a complete agreement of the liquidus curve could be attained. Alloys with a 10, 20, 30, 32, 35, 38, 42, 43, 45, 50, 60, 70, 80, 90 and 99 % content of zinc were produced. On the action of antimony upon zinc ZnSb with 35 % zinc is the most important compound forming on that occasion. This compound has a partial peritectic melt at 547,5 °C. The most complicated thermogram was produced for the compounds Zn_4Sb_3 and Zn_3Sb_2 . In the system Sb-Zn the chemical interaction of the components in the nonequilibrium state can be concluded on the basis of the equi-

Card 1/2

78-3.3.23/47

On the Phase Diagrams in the System Sb-Zn in the State of Nonequilibrium

librium phase diagram. By the determination of electric conductivity and density in the system Sb-Zn follows that the compound $ZnSb$ does not decompose during melting. There are 9 figures and 9 references, which are Soviet.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet, kafedra neorganicheskoy khimii.
(Voronezh State University, Chair for Inorganic Chemistry)

SUBMITTED: June 25, 1957

Card 2/2

UGAY, Ya.A.

Structural diagram Sb - Zn system in unbalanced state. Zhur. neorg.
khim. no.3:678-682 '58. (MIRA 11:4)

1. Voronezhskiy gosudarstvennyy universitet kafedra neorganicheskoy
khimii.
(Antimony-zinc alloys)

PALKIN, A.P., prof., otv. red.; ZAVGORODNIY, S.V., red.; OCHNEVA,
O.S., red.; PEROVA, A.P., red.; UGAY, Ya.A., red.; SHATALOV,
A.Ya., red.; SHATALOV, V.P., red.

[Transactions of the Voronezh Branch of the D.I.Mendeleev All-
Union Chemical Society] Sbornik trudov Voronezhskogo otdele-
niia Vsesoiuznogo khimicheskogo obshchestva imeni D.I.Mende-
leeva. Voronezh, Voronezhskoe knizhnoe izd-vo. No.2. 1959.
(MIRA 17:5)
184 p.

1. Vsesoyuznoye khimicheskoye obshchestvo imeni D.I.Mendeleyeva.
Voronezhskoye otdeleniye.

UGAY, Ya.A.; VIGUTOVA, T.N.

New intermetallic semiconductor compounds. Fiz.tver.tela 1
no.12:1786-1788 D '59. (MIRA 13:5)

1. Voronezhskiy gosudarstvennyy universitet.
(Semiconductors)

UGAY, YA. A.

82795

S/081/60/000/009/002/002
A003/A001

11.8000
Translation from: Referativnyi zhurnal. Khimiya, 1960, No. 9, p. 65, # 34069

AUTHOR: Ugay, Ya.A.

TITLE: On the Problem of Heat Explosion in Some Solid-Phase Reactions

PERIODICAL: Tr. Voronezhsk. un-ta, 1959, Vol. 57, pp. 23-29

TEXT: With the aid of Kurnakov's pyrometer with automatic heat regulation, the development of an exothermic reaction in mixtures of powder-like halides and pure metals was investigated. At a sufficiently high heating rate, the accelerating exothermic reaction changes into a heat explosion, e.g., in a CuCl+Zn mixture at 220°C, and in a mixture of PbCl₂+Zn at 278°C. Heat explosion arises also in mixtures of metal powders, if they are sufficiently finely ground, e.g., in a mixture of Fe and Al at 557°C. The development of an exothermic reaction in coarsely-grained material is damped and it is resumed again after melting of Al. The increased activity of newly-prepared powders of salts and metals is noted, which is ascribed to the formation on their surface of free valencies.

A. Sokolik

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

UGAY, Ye.A.; KOROTKOVA, Ye.I.

Interaction between copper and zinc under nonequilibrium conditions. Trudy VGU 57:31-37 '59. (MIRA 13:5)
(Copper) (Zinc)

KAPSHUKOV, I.I.; UGAY, Ya.A.

Asymmetry of $K_{1,2}$ lines of zinc in its semiconductor compounds
with antimony. Fiz. tver. tela 3 no.1:100-102 Ja '61.
(MIRA 14:3)

1. Voronezhskiy gosudarstvennyy universitet.
(Zinc antimonide)

24-7700
5.2610

24054
S/020/61/138/004/015/023
B103/B203

AUTHORS: Ugay, Ya. A., Dolgova, Yu. Ya., and Zyubina, T. A.

TITLE: The intermetallic compound Cd_4Sb_3

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 4, 1961, 856-858

TEXT: Within the systematic study of semiconductor compounds, the authors studied the system Cd-Sb. In addition to the known compounds CdSb (stable) and Cd_3Sb_2 (metastable), they detected Cd_4Sb_3 (similar to Zn_4Sb_3) in the system Cd-Sb. They studied this system thermographically and by X-rays, and examined its microstructure and microhardness. They studied the electrical conductivity and the thermo-emf on cadmium alloys with a maximum of $5 \cdot 10^{-3}\%$ impurities, and antimony of the type Cy 000 (Su000). KAO (KdO cadmium and Cy 00 (Su00) antimony were used for other determinations. Three series of alloys were heated to $650^\circ C$ in evacuated (to $7 \cdot 10^{-3}$ mm Hg) Pyrex ampuls, and shaken at $500-550^\circ C$ for 5 hr. Series 1 was cooled in the air, series 2 together with the furnace, series 3 was annealed between 250 and $420^\circ C$ for one week. Kurnakov's pyrometer of the type $\Phi NK-55$

Card 1/4

The intermetallic compound ...

24054
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H103/B203

(FPK-55) with an evacuated Stepanov vessel [Abstracter's note: Stepanov vessel not stated] was used for taking thermograms. Debye patterns were recorded with a standard camera. Fig. 1 shows the phase diagram of the system Cd-Sb on the basis of all results. The new compound Cd_4Sb_3 (44.9% by weight of Sb) is pointed out. It melts congruently at 460°C . Both the microhardness (180 kg/mm^2) and the microstructure of Cd_4Sb_3 deviate from the values of known compounds. The microstructure indicates perfect homogeneity. In contrast to other compounds of the system Cd-Sb, Cd_4Sb_3 is formed under quick cooling. Its existence is confirmed by X-ray examination. Cd_4Sb_3 has a tetragonal lattice, probably of the rutile type, namely: $a = 8.1$, $c = 13.0 \text{ \AA}$, $c/a = 1.6$, whereas CdSb crystallizes in the rhombic, and Cd_3Sb_2 in the monoclinic system. Cd_4Sb_3 forms, in a pure state, silver-gray, brilliant, very brittle crystals with a fracture reminding of germanium. When heated in the air, they oxidize much less than other phases of the system Cd-Sb, and they have a specific conductivity of $20 \text{ ohm}^{-1}\text{cm}^{-1}$ at room temperature. Their highest

Card 2/4

24054

S/020/61/138/004/015/023
B103/B203

The intermetallic compound ...

thermo-emf observed was 420 $\mu\text{V}/\text{degree}$, which decreased strongly at high temperature. The temperature dependence of Cd_4Sb_3 shows typical semiconductor features. Dislocations of the spiral type are visible on the surface of Cd_4Sb_3 single crystals produced by Bridgman's method (V. D. Kuznetsov, Ref.4: Kristally i kristallizatsiya (Crystals and crystallization), 1953, p.338). Cd_4Sb_3 crystals will become much larger when cooling is accelerated. Cd_4Sb_3 can dissolve excessive Sb amounts (up to 2% at room temperature). On a decrease in temperature, the excess is separated out again. Excess cadmium is practically not dissolved in Cd_4Sb_3 . Both pure Cd_4Sb_3 and solid solutions of Sb in it are hole conductors. On the other hand, CdSb with excess Sb shows electron conductivity. There are 4 figures and 5 Soviet-bloc references.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

PRESENTED: January 20, 1961, by I. I. Chernyayev, Academician

SUBMITTED: January 15, 1961

Card 3/4

075/61/000/000/014/020

075/E535

AUTHOR Ugay Ya. A.

TITLE On some new antimony-based semiconductor phases

SOURCE Soveshchaniye po poluprovodnikovym materialam 4th
Voprosy metallurgii i fiziki poluprovodnikov, polu-
provodnikovyye soyedineniya i tverdye slavy
Trudy soveshchaniya Moscow, Izd-vo AN SSSR, 1961.
Akademiya nauk SSSR Institut metallurgii imeni
A. A. Baskova Fiziko-tekhnicheskiy institut, 107-109

TEXT The intermetallic compounds Li_3Sb , Na_3Sb , $NaSb$ were produced and some of their properties investigated. For producing these compounds ordinary methods of synthesis in evacuated ampoules are unsuitable. Therefore the required quantities of the starting metals were charged into a steel crucible which was placed into a specially prepared reaction unit made of a refractory alloy. This unit was filled with dry inert gas and then hermetically closed. Following that, it was heated in a furnace to the required temperature, maintained at that temperature for 30 min and then the furnace was switched off and
Card 1/5

On some new antimony-based...

S/576/61/000/000/014/020
E073/E535

the unit was allowed to cool slowly in the closed furnace. As initial materials sodium of 99.8% purity, lithium of 99.6% purity (with impurities of Mg, Fe, Mn, Al and others) and antimony with a total content of impurities of $2.1 \times 10^{-3} \%$ were used. The composition of the compounds was chemically analysed with a maximum error of 0.01%. The sodium compounds were additionally subjected to thermal analysis in a nitrogen atmosphere. A temperature vs time graph is given in Fig.1 for the compound Na_3Sb . The endothermic nature of the fusion process, together with the results of chemical analysis, confirmed the absence of a second phase (this does not apply to chemically pure Na_3Sb compounds). The reproducible results obtained by the author showed a fusion temperature for Na_3Sb which is somewhat higher than the value published by Mathewson (Ref.3, Z.anorg. u. allg. Chem., 1906, 192). A characteristic feature of all the compounds produced is their low stability in air. Therefore it was practically impossible to investigate and photograph their microstructure. The electric conductivity was measured by means of a compensation method and the sign of the current was determined from the thermal e.m.f. The conductivity vs temperature dependence was

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S/576/61/000/000/014/020
E073/E435

On some new antimony-based...

determined using a specially manufactured vacuum furnace in which a vacuo of 5×10^{-2} mm Hg was maintained during the measurements. Under these conditions the specimens did not oxidize and did not become decomposed by water vapour. Fig.2 shows the temperature dependence of the conductivity of Li_3Sb with varying deviations from the stoichiometric composition (curve 1 - excess Sb 0.01%, curve 2 - excess Sb 0.6%). In spite of the appreciable deviations from stoichiometry, no metallic conductivity was observed in the range of mixed conduction. Thus, Li_3Sb and Na_3Sb do not show semi-metallic properties, in contrast to those intermetallic semi-conductors like ZnSb and CdSb . The $\lg \sigma$ versus $1/T$ curve does not show any region of depletion of the impurity current carriers, whilst the analogous curve for Na_3Sb (Fig.3) shows clearly such a region. The following table contains data on the compounds investigated.

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S/576/61/000/000/014/020
E073/E435

On some new antimony-based ...

Substance	Colour	$T_{fus},$ °C	$\sigma, m^{-1}cm^{-1}$ at 20°C	E_o, eV	Conduct- ivity
Li_3Sb	Light grey	-	1.8×10^{-4}	1.25	p-type
Na_3Sb	Bluish grey	859	9.5×10^{-5}	1.52	"
$NaSb$	Silvery white	465	2.1	0.82	"

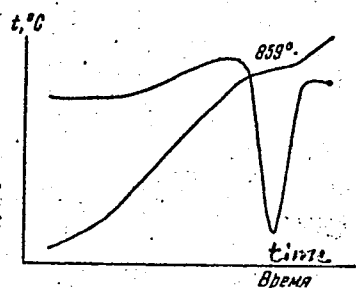
The width of the forbidden zone of the $NaSb$ is 0.82 eV, which is slightly smaller than for KSb . This is explained by the fact that KSb is more ionic than $NaSb$ since the electronegativity of potassium is less than that of sodium. The p-type conductivity of all the specimens investigated is attributed to the following two causes: 1) In compounds with a high fraction of ionic bonds the admixture atoms which fulfil the function of a non-metal always form acceptor levels. In the compounds investigated, antimony plays the role of an anion forming element. 2) Spontaneous crystallization without subsequent annealing leads to numerous lattice defects which usually act as acceptors. The students T.N.Vigutova, V.Z.Anokhin and O.Ya.Gukov participated in the experimental part of the work. There are 3 figures, 1 table

Card 4/5

S/576/61/000/000/014/020
E073/E435

On some new antimony-based ...

and 4 references: 2 Soviet and 2 non-Soviet. The English-language reference reads as follows: Ref.4: H.Pritchard, H.Skinner, Chem. Rev., 1955, 65, 745.



Card 5/5 Fig.1.

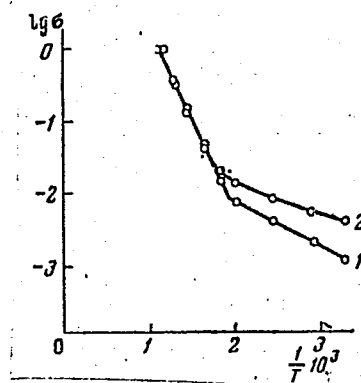


Fig.2.

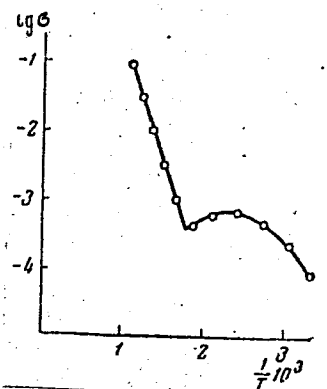


Fig.3.

and complex semiconductor compounds and devices (p. 2)

ACCESSION NR: AR301277

SUB CODE: 33, 7

ALL 1

Card 2/2

24.7700

36469

S/181/62/004/003/007/045

B102/B104

AUTHORS: Ugay, Ya. A., Averbakh, Ye. M., Marshakova, T. A., and Matveyev, O. V.

TITLE: Some electrical properties of the intermetallic semiconducting compound Cd_4Sb_3 doped by various impurities

PERIODICAL: Fizika tverdogo tela, v. 4, no. 3, 1962, 615 - 617

TEXT: In order to determine the effect of Ag, Cd, In, Sn, Pb, Sb, and Te impurities in quantities of up to 1 at% on Cd_4Sb_3 , the temperature dependence of conductivity in the range 20 - 300 °C, the Hall constant, and the thermo-emf at room temperature were measured. d - c measurements were made with a two-probe compensation method; the thermo-emf was determined with respect to copper; the field strength in the slit of the electromagnet was 2500 oe. Cd_4Sb_3 (impurity concentration $2.1 \cdot 10^{-3}\%$) was fused together with the doping metals (purity 99.996%) in evacuated quartz ampoules. The conduction type of the stoichiometric Cd_4Sb_3 (p-type) was changed only by Te impurities.

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S/181/62/004/003/007/045
B102/B104

Some electrical properties ...

Composition	Thermo-emf $\mu\text{V/deg}$	Conductivity $(\text{ohm}\cdot\text{cm})^{-1}$	Carrier mobility $\text{cm}^2/\text{v}\cdot\text{sec}$
Cd_4Sb_3	+100	30	900
with Ag	+47	4000	800
with In	+130	80	45
with Te	+29 or -77	2900 or 5100	345 or 1035

The forbidden band width as determined from the $\log \sigma$ versus $(1/T)$ curve was 1.25 ev. Cd_4Sb_3 of stoichiometric composition has a carrier concentration of $2 \cdot 10 \cdot 10^{17} \text{ cm}^{-3}$. Sb additions increase this value up to $\sim 10^{18} \text{ cm}^{-3}$, the other metals even up to $\sim 10^{19} \text{ cm}^{-3}$. The Cd-Sb alloy consists of CdSb and Cd_4Sb_3 . The stoichiometric and the Te-doped samples (p-type) show rectifying properties; the Te-doped samples also show a range of negative resistivity in the back direction. If the current is raised to more than 4 ma the rectifying effect vanishes. There are 2 figures, 1 table, and 5 Soviet references.

Card 2/3

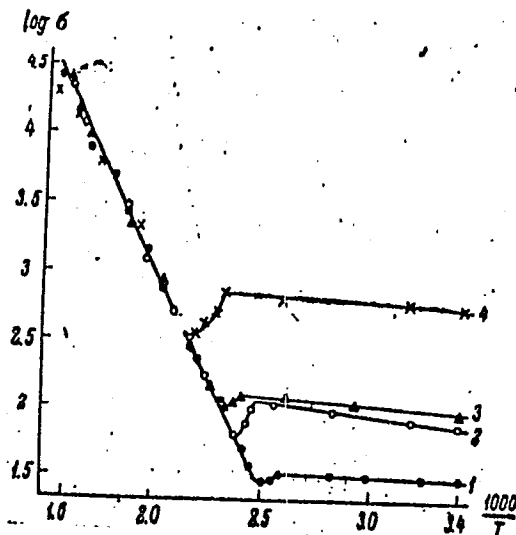
Some electrical properties ...

S/181/62/004/003/007/045
B102/B104 .

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: October 2, 1961

Legend to Fig. 1: (1) Cd_4Sb_3 ,
(2) $\text{Cd}_4\text{Sb}_3 + \text{In}$, (3) $\sim + \text{Sb}$,
(4) $\sim + \text{Cd}$.



Card 3/3

43130
S/181/62/004/011/031/049
B125/B186

24.778-0

AUTHORS: Ugay, Ya. A., Averbakh, Ye. M., and Lavrov, V. V.

TITLE: Certain electric properties of the intermetallic compound
 β -Zn₄Sb₃

PERIODICAL: Fizika tverdogo tela, v. 4, no. 11, 1962, 3270-3272

TEXT: In order to reveal semiconducting properties in stoichiometric Zn₄Sb₃ the temperature dependences of the electric conductivity and of the thermo-emf, of single and polycrystals were measured in the range 20-400°C. The Hall constant was measured at room temperature. A stoichiometric melt of Zn and Sb was kept slightly above the melting point of Zn₄Sb₃ and was continuously mixed by vibration. Small crystals of β -modification were prepared by quenching the melt in ice-water. The coarsely crystalline specimens were produced by slowly cooling. Single crystals were obtained by zone melting of the coarsely crystalline specimens. At room temperature all samples showed hole-type conductivity. Results: Zn₄Sb₃ can be purified by zone melting. β -Zn₄Sb₃ is a semiconductor with a width of the forbidden Card 1/3

Certain electric properties of...

S/181/62/004/011/031/049
B125/B186

band of 1.20 ev. The clear metallic conductivity of the β sample A7 (Fig.1) is attributed to additional acceptors formed as a result of lattice defects in quenching. There are 2 figures and 1 table.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: June 29, 1962

Fig. 1. $\log \sigma$ versus inverse temperature. Legend: B5 - single crystal, 612 - coarsely crystalline, A7 - β -modification.

Fig. 2. Differential thermo-e.m.f. ($\mu\text{V}/\text{deg}$) versus inverse temperature.

Card 2/3

S/078/62/007/003/019/019
B110/B138

Production and investigation...

chloric acid solution of SbCl_3 , introduced into the lower end of the column produced: $\text{SbCl}_3 + 3\text{HCl} + 3\text{Mg} = 3\text{MgCl}_2 + \text{SbH}_3\uparrow$. SbH_3 was dried with CaCl_2 and reacted as follows: $3\text{HgCl}_2 + 2\text{SbH}_3 = \text{Hg}_3\text{Sb}_2 + 6\text{HCl}\uparrow$. The reaction took 2 - 3 hrs. The specific gravity of the powdery heavy gray Hg_3Sb_2 , determined pycnometrically, was 6.0 g/cm^3 . When heated in air Hg_3Sb_2 decomposes to mercury and antimony oxides around 400°C , and if heated in vacuum, into its elements at above 450°C . It is practically insoluble in water, alkali, and hydrochloric acid, partly soluble in concentrated HNO_3 , and highly soluble in boiling H_2SO_4 and aqua regia. When left in air it moistens after 2-3 weeks and Hg drops separate. Its electrical resistivity, by the compensation method and a $\pi\pi\pi\text{B}-1$ (PPTV-1) potentiometer measured on a tablet pressed from the powder (250 kg/cm^2), was $10^{12} \text{ ohms}\cdot\text{cm}$. In cast Hg_3Sb_2 at room temperature conductivity is $\sim 10^{-11} \text{ ohm}^{-1}\cdot\text{cm}^{-1}$. The sign of the thermo-e.m.f. points to hole conductivity. The logarithmic temperature dependence, $\log \sigma = f(10^3/T)$, of specific conductivity at $7\cdot 10^{-3} \text{ mm Hg}$ shows that dissociation begins at

Card 2/3

Production and investigation...

S/078/62/007/003/019/019
B110/B138

370°C (3.8 ± 0.2 eV). As the valence and conduction bands are far apart, Hg_3Sb_2 is close to the dielectrics, Good absorption properties prove the nonmetallic character of its chemical bond. There are 2 figures and 9 references: 7 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry, 9, p. 391, 1947.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: September 28, 1960

Card 3/3

S/078/62/007/004/014/016
B107/B101

7.4/77

AUTHORS:

Ugay, Ya. A., Kotosonov, N. V., Fogel'son, R. L., Tkacheva,
G. S.

TITLE:

Some properties of Ca_3Sb_2 prepared by the method of S. A.
Vekshinskiy

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 4, 1962, 930 - 931

TEXT; The present paper describes the preparation of a thin film (5 - 20 μ) of Ca_3Sb_2 . The temperature dependence of the specific conductivity was measured (Fig. 2). The compound Ca_3Sb_2 has hitherto not been synthesized, and has only been mentioned by M. Hansen (see below). It was obtained by simultaneous evaporation of Ca and Sb in a vacuum of 10^{-5} mm Hg (method of S. A. Vekshinskiy; Novyy metod metallograficheskogo analiza splavov (A new method of metallographic analysis of alloys), Gostekhizdat, 1944). The vapor was collected by mica foils previously heated to 300°C. The resulting film transmits a narrow stripe of orange-colored light, corresponding to Ca_3Sb_2 . The compound can be left in air for a long time.

Card 1/2

Some properties of Ca_3Sb_2 ...

S/078/62/007/004/014/016
B107/B101

The resistance was measured with electrodes deposited on the foils by the evaporation of antimony. Preliminary experiments had shown that the resistance of antimony was negligible. The resistivity of calcium antimonide at room temperature is 10^4 ohm·cm. The measurements are well reproducible. The distance between the valency band and the conduction band was calculated to be 1.4 ± 0.1 ev. Calcium antimonide is a slightly photoconductive compound. Its photoconductivity is increased by an oxide film which forms when the system is left without further evacuation. There are 2 figures and 7 references: 6 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: M. Hansen. Constitution of Binary Alloys. New York, 1958.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: February 20, 1961

Fig. 2. Specific conductivity of Ca_3Sb_2 as a function of temperature.

Card 2/3

S/275/63/000/002/009/032
D405/D301

AUTHOR: Ugay, Ya.A.

TITLE: Physicochemical analysis and chemistry of semiconductors

PERIODICAL: Referativnyy zhurnal, Elektronika i ee primeneniye, no. 2, 1963, 2, abstract 2310 (Fiz.-khim. analiz solevykh sistem, Rostov-na-Donu, Rostovsk. un-t, 1962, 201-212 (Collection))

TEXT: The main problems of semiconductor chemistry are formulated: the search for new semiconductor materials of given properties; ascertaining the nature of the chemical bond in semiconductors; studying the dependence of the electrical and physicochemical properties on the composition; the development of methods for obtaining semiconductors of high purity [Abstracter's note: In the Russian text the word "chastota" appears, which is obviously a misprint for "chistota"] and perfect single crystals; the development of methods of determination of micro-impurities; the study

Card 1/2

Physicochemical analysis ...

S/275/63/000/002/009/032
D405/D301

of the properties of thin-layer semiconductors. Methods of solution of these problems with the help of physicochemical analysis are discussed, and examples are given of scientific research work carried out in this direction on various semiconductor materials. 75 references.

[Abstracter's note: Complete translation]

Card 2/2

3

Investigation of semiconducting phases based on antimony. Ya. A. Ugay.

Semiconducting phases in the system zinc-antimony. Ya. A. Ugay,
Ye. M. Averbakh.

[Study and some properties of thin layers of indium phosphide.
Ya. Ugay, R. L. Fogel'son, V. V. Lavrov. (Not presented).]

Report presented at the 3rd National Conference on Semiconductor Compounds,
Kishinev, 16-21 Sept 1963

49ay, Ya, A.
AID Nr. 979-7 29 May

CHEMICAL BOND IN SEMICONDUCTING COMPOUNDS OF Zn AND Sb (USSR)

Ugay, Ya. A., Ye. P. Domashevskaya, and T. A. Marshakova. Zhurnal
strukturnoy khimii, v. 4, no. 2, Mar 1963, 250-253.

S/192/63/004/002/001/002

Short-range interatomic order in the semiconducting compounds Zn_3Sb_2 , $ZnSb$, and Zn_4Sb_3 has been studied by x-ray spectroscopy at the Voronezh State University. The $K\alpha_1$ and $K\alpha_2$ lines of Zn in all three compounds were observed to shift toward the short-wavelength region as compared with the same lines in Zn metal. The shift, which increased in the order $Zn_3Sb_2 < ZnSb < Zn_4Sb_3$, is attributed partly to an assymetric distribution of density in the electron cloud. This distribution is responsible for a decrease in the shielding effect of the valence electrons and, thus, for an increase in the effective charge of the cationic nucleus. The shift is ascribed in part also to the difference in valency of the cationic element in each compound. The shift of the $K\alpha_1$ and $K\alpha_2$ lines per unit of "formal" valency, that is, the ratio of the total number of valence

Card 1/2

AID Nr. 979-7 29 May

CHEMICAL BOND [Cont'd]

S/192/63/004/002/001/002

electrons in Sb to the number of Zn atoms in the compound, was shown to increase in the order $\text{ZnSb} < \text{Zn}_3\text{Sb}_2 < \text{Zn}_4\text{Sb}_3$. The contribution of the ionic bond increases in the same order and is correlated with the semiconducting properties of the compounds. The same correlation exists in the series CdSb , Cd_3Sb_2 , and Cd_4Sb_3 ; that is, the widths of the forbidden zone in these semiconductors increase in the same order as the ionic-bond contribution.

[JK]

Card 2/2

L 11116-63

ACCESSION NR: AP3000602

EWI(q)/EWI(r)/BDS AFFTC/ASD JD

S/0181/63/005/005/1291/1292

AUTHOR: Ugay, Ya. A.; Averbakh, Ye. M.

TITLE: Some electrical properties of intermetallic $\epsilon\text{-Zn}_3\text{Sb}_2$

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1291-1292

TOPIC TAGS: zinc antimonide electrical property, zinc antimonide electroconductivity, zinc antimonide differential thermal emf

ABSTRACT: Measurements of temperature dependence of electroconductivity and differential thermal emf in the interval of 20 to 470C were carried out on five polycrystalline specimens of $\epsilon\text{-Zn}_3\text{Sb}_2$ of stoichiometric composition obtained by slow-cooling the melt. It was established that the low temperature ϵ -phase of Zn_3Sb_2 is a hole-type semiconductor with a 0.2-ev width of the forbidden zone. The hole concentration of $6.6 \times 10^{18} \text{ cm}^{-3}$ and mobility of $200 \text{ cm}^2/\text{v} \times \text{sec}$ were determined from the measurements of the Hall effect at room temperature and 4000-oe magnetic field intensity. The discontinuities of the differential thermal emf observed at 405 and 437C can be explained by phase transitions of the intermetallic Zn_3Sb_2 compound. Orig. art. has: 1 figure.

Card 1/2,

Voronezh St. University

UGAY, Ya.A.; MARSHAKOVA, T.A.; GONCHAROV, Ye.G.

Effect of the nature of the chemical bond on the solubility
of inorganic substances in the solid state. Zhur.neorg.khim.
8 no.1:177-185 Ja '63. (MIRA 16:5)
(Chemical bonds) (Solutions, Solid)

L 16976-63
Pz-4 JD/AT

EWI(1)/EWG(k)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3/IJP(C)
S/020/63/149/006/023/027

70

AUTHOR: Ugay, Ya. A., Averbakh, Ye. M., Gukova, Yu. Ya., and Lavrov, V. V.

TITLE: A new semiconductor phase in zinc-antimony system

PERIODICAL: Akademiya nauk SSSR. Doklady. v. 149, no. 6, 1963, 1387-1389

TEXT: The authors investigated the intermetallic compound Zn_4Sb_3 in the Zn-Sb system, suspecting this compound to be a semiconductor. To prove this, they chose the beta-modification of Zn_4Sb_3 , stably existing between -10 and 485°C. They isolated for the first time monocrystals of this compound by three different techniques and found it to be a gray substance with a metallic luster, fairly brittle, with a slightly vitreous, conchoidal fracture. Microhardness approximately 200 kg/mm². The pycnometric specific weight of large crystals is 6.81. The possibility of cleaning this compound by zone recrystallization was demonstrated. The physicochemical and electrical properties of Zn_4Sb_3 also are described here for the first time. There are 3 figures and 1 table.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: August 3, 1962

Card 1/1

ACCESSION NR: APL011728

S/0181/64/006/001/0003/0006

AUTHORS: Ugay, Ya. A.; Khukhryanskiy, Yu. P.

TITLE: Determining the solubility of gallium in solid germanium by saturation currents of a p n junction

SOURCE: Fizika tverdogo tela, v. 6, no. 1, 1964, 3-6

TOPIC TAGS: gallium solubility, solubility, germanium, saturation current, p n junction, etching, Perhydrol, indium

ABSTRACT: By measuring the saturation currents of alloyed junctions, the authors have determined the solubility of Ga in solid Ge during crystallization in the system Ge-In-Ga (with low Ga content). The studies were made in the temperature interval 360-550C. The concentration of Ga in the Ge was determined by measuring the saturation current of the p-n junction of samples in which the p-zone consisted of a recrystallized layer of Ge. This layer was formed by fusion of In platelets (with Ga addition) to n-type Ge. Etching was done with Perhydrol to which NaOH had been added, and the depth of etching was 0.19 mm. The concentration of Ga in

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ACCESSION NR: APL011728

Ge is shown graphically in Fig. 1 on the Enclosure (in comparison with data from other authors). Some deviation is apparent, but the authors conclude that if the experimental curve is extrapolated to a temperature of about 600C (as shown by the dashed lines in Fig. 1) the results will agree with data from the literature. It is concluded that in the interval tested In decreases the solubility of Ga in Ge. Orig. art. has: 4 figures and 4 formulas.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 17May63

DATE ACQ: 14Feb64

ENCL: 01

SUB CODE: PH

NO REF SOV: 004

OTHER: 005

Card 2/2

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8

On 21 July 1964, the U.S. State Department announced that it had received information from a source that the Soviet Union was planning to launch a surprise attack on the United States.

APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R001857820011-8"

ASSOCIATION: The Association of American Universities
University of

DOMASHEVSKAYA, E.P.; UGAY, Ya.A.

¹²₂15-emission spectra of cadmium and antimony in certain
semiconducting compounds. Izv. AN SSSR.Ser. fiz. 28 no. 5:
853-856 My '64. (MIRA 17:6)

1. Voronezhskiy gosudarstvennyy universitet.

UGAY, Ya.A.; AVERBAKH, Ye.M.; FOGEL'SON, R.L.; GOL'DFARB, V.A.

Some properties of thin films of indium phosphide. Izv. AN
SSSR. Ser. fiz. 28 no.6:998-999 Je '64. (MIRA 17:7)

1. Voronezhskiy gosudarstvennyy universitet.

ACCESSION NR: AP4038777

S/0048/64/028/005/0853/0856

AUTHOR: Domashevskaya, E.P.; Ugay, Ya.A.

TITLE: $\text{I}\beta_{2,15}$ emission spectra of cadmium and antimony in some semiconducting compounds /Report, Seventh Conference on X-Ray Spectroscopy held in Yerevan 23 Sep to 1 Oct 1963/

SOURCE: AN SSSR. Izvestiya, Seriya fizicheskaya, v.28, no.5, 1964, 853-856

TOPIC TAGS: x-ray spectrum, x-ray emission, cadmium, cadmium compound, antimony, antimony compound, semiconducting material, chemical bond

ABSTRACT: The $\text{I}\beta_{2,15}$ emission spectra of cadmium and antimony were recorded for the metals and for a number of compounds in order to determine the effect on them of different types of chemical bonding. The cadmium spectra were recorded for CdSb , Cd_4Sb_3 and CdS ; the antimony spectra were recorded for CdSb , Cd_4Sb_3 , AlSb , GaSb , InSb , Sb_2Se_3 and Sb_2S_3 . A spectrograph with Johann focusing was employed. The cadmium spectra were recorded with a dispersion of 18.7 eV/mm in the first order reflection from the (111) planes of a bent (50 cm radius) silicon crystal; the antimony spectra were recorded with a dispersion of 6.1 eV/mm in the first order reflection.

Card 1/3

ACCESSION NR: AP4038777

tion from the (0001) planes of a quartz crystal. The spectra are very similar, showing the β_2 and β_{15} spin doublets and weak short wavelength structure of unknown origin. The Sb spectra are the more symmetric, the Cd spectra being considerably extended in the short wavelength direction. The simplest spectra are those of the metals, which show only a single unresolved spin doublet. The spectrum of the nearly covalent compound InSb is very similar to that of the metal, as is also the spectrum of GaSb. The compounds CdSb, Cd_4Sb_3 , CdS, AlSb, Sb_2Se_3 and Sb_2S_3 are semiconductors with mixed ionic-covalent bonds. Both the Cd and Sb spectra of these compounds show both the spin doublets, and these are displaced with respect to each other. The separation of the spin doublet in the semiconducting compounds indicates the presence of two energy states of the Cd or Sb atom corresponding to the mixed ionic-covalent character of the bond. This separation is small in CdSb, indicating the predominately covalent character of this compound. The maximum of the Cd spectra is shifted toward the shorter wavelengths in the compounds compared with its position in the metal. This is ascribed to participation of Cd 4f electrons, along with the 5s valence electrons, in the chemical bonding. A similar phenomenon is mentioned in connection with the Sb spectra, but it is less convincingly revealed by the curves presented. Orig.art.has: 2 figures and 2 tables.

Card 2/3

ACCESSION NR: AP4038777

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 00

DATE ACQ: 12Jun64

ENCL: 00

SUB CODE: OP

NR REF SOV: 013

OTHER:007

Card 3/3

ACCESSION NR: AP4041363

S/0048/64/028/006/0998/0999

AUTHOR: Ugay, Ya. A.; Averbakh, Ye. M.; Fogel'son, R. L.;
Gol'dfarb, V. A.

TITLE: Some properties of thin indium phosphide layers

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 6,
1964, 998-999

TOPIC TAGS: indium, indium phosphide, indium phosphide film, indium
phosphide property, film property, film electric conductivity

ABSTRACT: The temperature dependence of electric conductivity of in-
dium phosphide twin films and of their limit of absorption in the
longwave range have been investigated. Films were produced by a
separate vacuum vapor deposition of components, first of indium and,
then of phosphorus, under pressure of about 10^{-5} mm Hg at 400C.
Electron diffraction patterns of the films corresponded to those of
the InP compound. The temperature dependence of electric conductivity
of InP films 0.55—0.06 μ thick was determined at 20—500C. One of
the two films investigated was first annealed in vacuum at 250C

Card 1/3

ACCESSION NR: AP4041363

for 3 hr. As shown in the diagram (see Fig. 1 of the Enclosure), the electric conductivity of the films at high temperature is almost identical. The width of the forbidden zone determined from this diagram is 1.42 ev. The width of the forbidden zone determined from the longwave absorption edge was 1.27 ev. The higher value obtained from the temperature dependence of electric conductivity is explained by partial decomposition of indium phosphide at high temperatures. Orig. art. has: 2 figures.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet
(Voronezh State University)

SUBMITTED: 00

ATD PRESS: 3058

ENCL: 01

SUB CODE: SS, IC

NO REF SOV: 002

OTHER: 001

Cord- 2/3

BR

ACCESSION NR: AP4041373

S/0048/64/028/006/1044/1047

AUTHOR: Ugay, Ya.A.; Averbakh, Ye.M.

TITLE: Some electric properties of single crystals of ZnSb-CdSb solid solutions
Report, Third Conference on Semiconductor Compounds held in Kishinev 16-21 Sep 1964

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.8, 1964, 1044-1047

TOPIC TAGS: semiconductor, solid solution, zinc antimonide, cadmium inorganic compound, electric conductivity, thermal emf, temperature dependence, Hall constant

ABSTRACT: The electric conductivity, Hall constant and thermal emf of single crystals of ZnSb-CdSb solid solutions were measured at temperatures from 20 to 220°C. The measurements were undertaken because of the low thermal conductivities and high thermal emf's of zinc and cadmium antimonides and the fact that these substances form solid solutions in all proportions. Single crystals of the solid solutions were obtained by the zone leveling method. The crystals of the solid solutions, as well as those of the pure compounds, had two unequally marked cleavage planes. The samples were oriented for measurement with the less marked cleavage plane parallel to the current and perpendicular to the magnetic field. All the materials proved to

Card 1/3

ACCESSION NR: AP4041373

be p-type semiconductors. The thermal emf was found to be positive for all the samples over the full temperature range investigated. This is regarded as an indication that the hole mobility exceeds the electron mobility in the intrinsic conduction region, i.e., that the materials are anomalous semiconductors. The Hall mobilities were found to be proportional to T^{-n} (T is the absolute temperature) with n between 1.7 and 2.0. The value of n for the pure compounds is 1.66. The difference is ascribed to the greater concentration of lattice defects in the solid solutions. In about half the samples the value of n increased suddenly by a large factor (about 4) at some temperature within the range investigated and remained large at higher temperatures. This behavior is not understood. The energy gap, as determined from the temperature dependence of the conductivity, was 0.41 eV in both pure compounds and was less in the solutions. The minimum energy gap was 0.21 eV and occurred at a composition of 64 mole percent CdSb. The energy gap determined from the temperature dependence of the Hall constant was approximately 20% greater than that determined from the conductivity. This discrepancy is ascribed to the fact that not only the energy gap, but also the formation of lattice defects, contributes to the temperature dependence of the Hall constant. Orig.art.has: 2 formulas, 4 figures and 1 table.

Card 2/3

ACCESSION NR: AP4041373

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 00

ENCL: 00

SUB CODE: SS, IC

NR REF SOV: 007

OTHER: 005

Card 3/3

CHEN, L.Y.; LUTSENKO, L.Ye.; BELY, Ya.A.

Electrochemical behavior and corrosion resistance of the alloys
of cadmium and zinc with antimony in sulfuric acid. Zhur. fiz.
khim. 33 no.6:1501-1508 Je '61. (NII 16:1)

L. Voronezhskiy gosudarstvennyy universitet.

ACCESSION NR: AP4036727

S/0020/64/156/002/0430/0433

AUTHOR: Ugay, Ya.A.; Domashevskaya, E.P.

TITLE: The nature of the chemical bond in A^{III} B^V semiconductor compounds

SOURCE: AN SSSR. Doklady*, v. 156, no. 2, 1964, 430-433

TOPIC TAGS: semiconductor, III-V semiconductor, chemical bond, chemical bond type, energy position, L band, antimony, AlSb, GaSb, InSb, CdSb, x ray analysis, electron cloud contraction, binary compound,

ABSTRACT: The shape and the energy positions of the L_{15,2}-bands of antimony in antimony metal and its semiconductor compounds AlSb, GaSb, InSb and CdSb were examined by x-ray analysis to determine the behavior of the valency electrons responsible for the chemical bond. The emission spectra (fig. 1.) consist of two unresolved bands L₁₅ and L₂ corresponding to the electron transitions N_V → L^{III} and N_{IV} → L^{III}. The shift in the L_{15,2} band toward the long wave (smaller energy) in AlSb, GaSb and CdSb is caused by the contraction of the electron cloud to the antimony lattice sites

Card 1/5

ACCESSION NR: AP4036727

of the indicated compounds; as the effective charge of the nucleus decreases, the $L_{15,2}$ band shifts toward the long wave side. No shift is observed in the $L_{15,2}$ spectra of InSb, and resolution of the $L_{15,2}$ band is practically absent because of the covalent character of the interatomic bond. InSb is the most covalent (and least ionic) compound in the series as evidenced by the exceptionally high electron mobility and small width of the forbidden zone. The decrease in the width of the band in going from AlSb to InSb (from 12.8 to 9.8 e.v.) also indicates an increase in the degree of covalency, with the electronegativity increasing from Al to In. A new arrangement for AB_3 compounds was drawn (see Fig.2) which fulfills the conditions for forming binary AB compounds with tetrahedral coordination of the atoms in the compound. There is an average of four valence electrons per atom. The shift in the Sb spectrum toward the direction of less energy, due to the electron cloud contraction toward Sb, results in Al lattice sites with δ^+ and Sb sites with δ^- charges, where δ is much less than 1. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

Card 2/5

ACCESSION NR: AP4036727

SUBMITTED: 23Dec63

SUB CODE: IC, SS

ATD PRESS: 3090

ENCL: 02

NO REF SOV: 005,

OTHER: 005

Card 3/5

ACCESSION NR: AP4036727

ENCLOSURE: 01

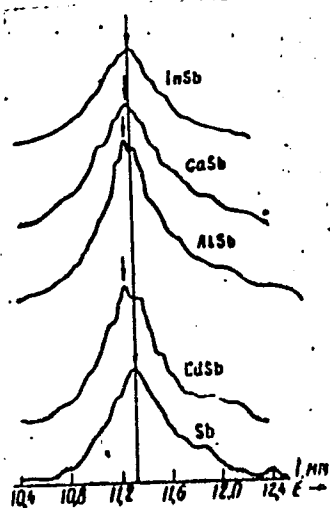


Fig. 1. Photometric curves of the $L_{15,2^-}$ spectra of antimony in compounds and in the metal

Card 4/5

ACCESSION NR: AP4036727

ENCLOSURE: 02

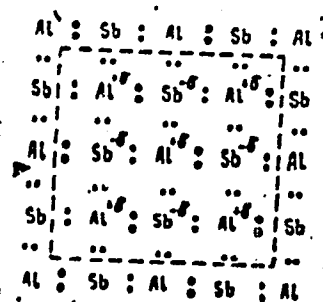


Fig. 2. Scheme of the chemical bonds in $Al^{III}B^V$ compounds exemplified by $AlSb$ (according to the author's data)

Carl 5/5

UGAY, Yakov Aleksandrovich; ABRIKOSOV, N.Kh., doktor khim. nauk,
prof., retsenzent; GORYUNOVA, M.I., doktor khim. nauk,
prof., retsenzent; FEDOROVA, T.P., red.

[Introduction to the chemistry of semiconductors] Vvedenie
v khimiiu poluprovodnikov. Moskva, Vysshaya shkola, 1965.
333 p. (MIRA 18:5)

1. Kafedra poluprovodnikovykh materialov Leningradskogo
politekhnikeskogo instituta im. M.I.Kalinina (for
Goryunova).

L 2624-66 EWT(m)/EPF(c)/T/EMP(t)/EMP(b)/EWA(c) IJP(c) ID/WR
 ACCESSION NR: AP5011363 UR/0365/65/001/002/0190/0194
 620.193.01

53
49
B

AUTHOR: Marshakov, I. K.; Ugay, Ya. A.; Vigdorovich, V. I.

TITLE: Mechanism of corrosion of the magnesium-zinc alloys

SOURCE: Zashchita metallov, v. 1, no. 2, 1965, 190-194

TOPIC TAGS: corrosion, magnesium alloy, zinc alloy, corrosion resistance, corrosion rate

ABSTRACT: The mechanism of corrosion of magnesium-zinc alloys was studied at room temperature in 0.5-normal NaCl, 0.5-normal NaBr, and 0.1-normal HCl solutions. In corrosion tests, 12-15 ml of electrolyte was used per cm² of sample surface. The test duration was 5 hours in neutral media and 30 minutes in acidic media. Corrosion of alloys containing up to 65% Zn is very fast and is accompanied by heavy sludge formation. An intercrystalline type of corrosion is characteristic of alloys containing 65-72% Zn. Alloys containing more than 72% Zn corrode at a low rate and in a uniform manner. The corrosion of alloys containing up to 72% Zn is determined by the work of the phase corrosion elements: a-solid solution--inter-

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L 2624-66

ACCESSION NR: AP5011363

metallic compound MgZn. On alloys containing 65-72% Zn, the anodic zones are small and dissolving proceeds along narrow channels between the individual grains of the intermetallic compound. Thus, the alloy material may be completely destroyed with small weight losses. ⁴ Intermetallic compounds such as MgZn, MgZn₂, and MgZn₅ participate in corrosion of alloys with over 72% Zn. As a result of difference in effectiveness of the corrosion elements, the rate of corrosion in bromide solutions is smaller than in chloride solutions. The rate of alloy corrosion in 0.5-normal NaCl is shown in fig. 1 of the Enclosure. The rate of alloy corrosion in 0.1-normal HCl is shown in fig. 2 of the Enclosure. The dependence of the steady-state potentials of alloys upon their composition is shown in fig. 3 of the Enclosure. Orig. art. has: 2 tables, 5 figures.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 26Sep64

ENCL: 02

SUB CODE: MM, GC ^{44.55}

NO REF SOV: 005

OTHER: 001

Card 2/4

L 2624-66
ACCESSION NR: AP5011363

ENCLOSURE 01

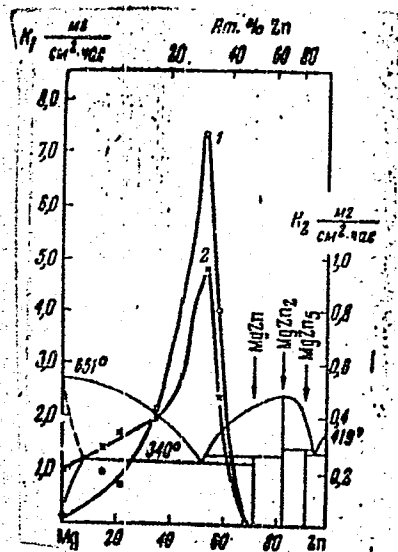


Fig. 1. 1--total material loss; 2--quantity of Mg in solution, K_1 --the ordinate for curve 1; K_2 --ordinate for curve 2.

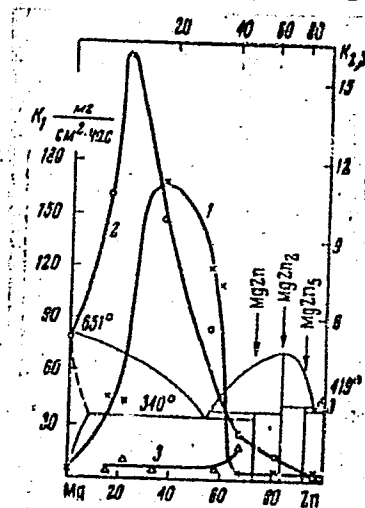


Fig. 2. 1--total material loss; 2--quantity of magnesium in solution; 3--quantity of zinc in solution; K_1 --ordinate for curve 1; K_2, K_3 --ordinate for curves 2 and 3.

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L 2624-66

ACCESSION NR: AP5011363

ENCLOSURE; 02

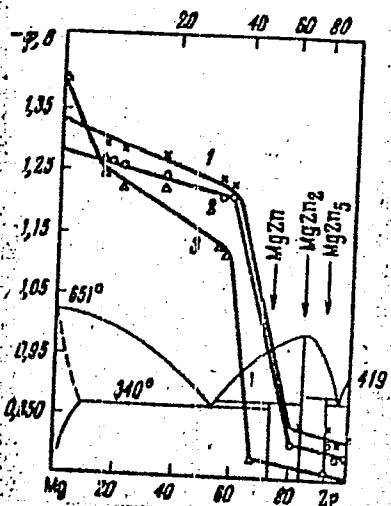


Fig. 3. 1--0.5n NaCl; 2--0.5n NaBr; 3--0.1n HCl.

Card 4/4 RP

L 2621-66 ENT(m)/EPF(c)/EMP(t)/EMP(b) IJP(c) JD/WB

ACCESSION NR: AF5011367

UR/0365/65/001/002/0233/0235
620.193.01

AUTHOR: Shatalov, A. Ya.; Tsygankova, L. Ye.; Ugay, Ya. A.

TITLE: Anodic oxidation and corrosion resistance of indium-antimony alloys

SOURCE: Zashchita metallov, v. 1, no. 2, 1965, 233-235

TOPIC TAGS: anodic oxidation, corrosion resistance, corrosion resistant alloy, antimony alloy, indium containing alloy

ABSTRACT: Anodic oxidation and corrosion resistance of indium-antimony alloys (0-100% Sb) was studied electrochemically. The intermetallic InSb compound was prepared by means of partial melting of n- and p-type single crystals with current carrier concentrations of 3.5×10^{14} and 2.0×10^{18} , respectively. The corrosion resistance experiments were carried out in 1-normal H_2SO_4 and in hydrogen atmosphere for 4 days. The anodic oxidation process was studied in solutions with pH = 0-14 at current densities of 0.01-1 mA/cm² using InSb single crystals. The stationary potentials and rate of corrosion of In-Sb alloys in 1-normal H_2SO_4 solution are shown in fig. 1 of the Enclosure. The maximum anodizing rate and the formation of

Card 1/4

L 2621-66

ACCESSION NR: AP5011367

3
a tight oxide layer on the anode coincides with an intermetallic InSb compound containing 51.5% Sb. The dependence of the rate of anodic oxidation (I) and of $\frac{d}{dt}$ (1/C) (II) in 0.1n Na₂B₄O₇ solution upon alloy composition is shown in fig. 2

of the Enclosure. The composition of the oxide layer formed on the anode containing 51.5% Sb corresponds to formula: (In₂O₃)₇·(Sb₂O₃). The anodizing process is found to be independent of the type of conductivity of the anode material. Orig. art. has: 1 table, 2 figures, 1 formula.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

SUBMITTED: 03Sep64

ENCL: 02

SUB CODE: MM, GC

NO REF SOV: 004

OTHER: 001

Card 2/4

L 2621-66

ACCESSION NR: AP5011367

ENCLOSURE: 01

$K, \frac{g}{cm^2 \cdot hr}$

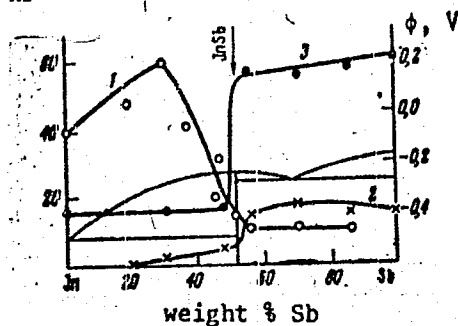


Fig. 1. 1--rate of corrosion based on indium; 2--rate of corrosion based on antimony and 3--stationary potentials in reference to a normal hydrogen electrode.

Card 3/4

L 2621-66

ACCESSION NR: AP5011367

ENCLOSURE: 02

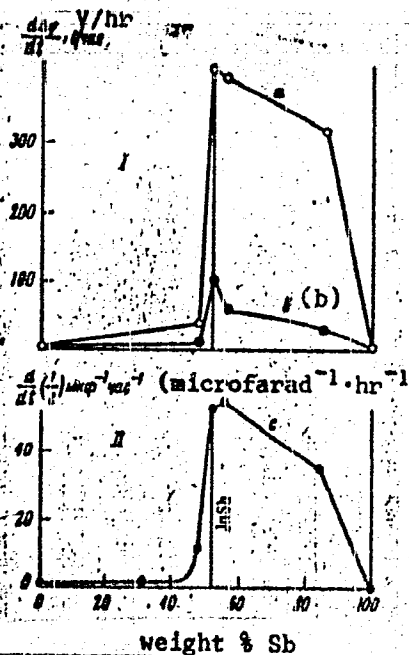


Fig. 2. a and c--0.5 mA/cm²;
b--0.1 mA/cm².

Card 4/4 DP

weight % Sb

L 2708-66 EWT(1)/EWT(m)/T/ENP(t)/EWP(b)/EWA(h)/EWA(c) IJP(c) JD/AT

ACCESSION NR: AP5017183

UR/0135/65/000/005/0129/0133

AUTHOR: Ugay, Ya. A.; Averbakh, Ye. M.; Kruglova, G. S.

TITLE: On the production of single crystals of semiconductor phases in the Zn-Sb system

SOURCE: IVUZ. Fizika, no. 3, 1965, 129-133

TOPIC TAGS: zinc alloy, antimony alloy, solid solution, single crystal growth, zone melting

ABSTRACT: The authors discuss the various technical difficulties involved in the production of single crystals of intermetallic ZnSb. Although they succeeded in using the Bridgman or the Chalmers method to produce single ZnSb crystals up to 12 mm long and 8 mm in diameter, drawn at a rate of 4 mm/hr, the end parts of the ingot were not monocrystalline, and the crystals contained an excess of antimony over the stoichiometric composition. It is shown, however, that such single crystals can be used as primers to grow stoichiometric ZnSb crystals by zone-melting. The technique and the properties of the grown crystals are described. It is claimed that the procedure employed conforms more closely to the properties of the Zn-Sb state diagram, is simpler, and takes less time. This technique was tried also to grow β -Zn₄Sb₃ single crystals, with limited success, owing to the low tem-

Card 1/2